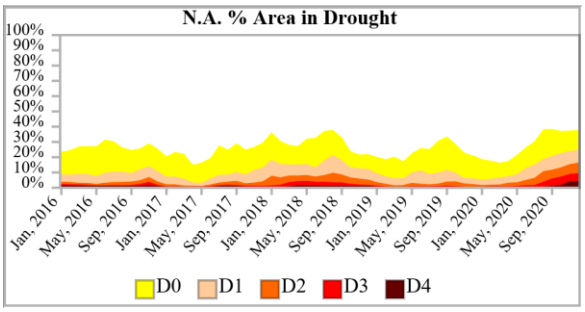
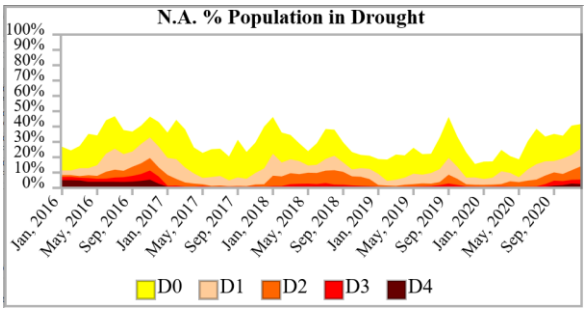
North American Drought Monitor – December 2020

At the end of December 2020, moderate to exceptional drought (D1-D4) affected 24.5% of the area and 25.1% of the population of North America. The percent area value was 0.8% more than the value for the end of November 2020. The percent population value was 4.0% more than the value for the end of November. At the end of December, 97.2% of the Rio Grande/Bravo River Basin and 62.0% of the Great Plains were in moderate to exceptional drought, 29.3% of the Columbia River Basin was in moderate to extreme drought (D1-D3), and 1.8% of the Great Lakes Basin was in moderate drought. The North American Great Plains extends across the United States and into adjacent parts of northeast Mexico and the southern Prairies of Canada. The percent area values for the Rio Grande/Bravo River Basin and Great Plains increased this month, while the values for the Great Lakes and Columbia River Basins decreased compared to the end of November.





CANADA:

National Overview

There were no significant changes to drought conditions throughout Canada in December. Overall, there was a small reduction of drought severity and extent. Mean monthly temperatures were reported as above normal for the entire country, with some areas experiencing as much as 5 degrees (or more) higher than normal. Nearly all areas of abnormally dry (D0) conditions were reduced throughout British Columbia. Despite long-standing dry conditions in southern areas, streamflow and snowpack remain adequate or above normal for this time of year. In the western Prairies, snowfall events in December led to reductions of drought and dry conditions. However, severe drought (D2) persists in southwestern Saskatchewan and southeastern Manitoba due to ongoing dry conditions in both the short and long term. Dry conditions carried over into northwestern Ontario. Conditions in Ontario, Quebec and the Atlantic region have improved significantly from earlier in the fall as all significant areas of moderate drought (D1) were removed. The Northern region remained relatively unchanged, barring a pocket of abnormally dry conditions developing around Yellowknife. Approximately 18% of the country was considered abnormally dry or in drought; this includes close to 35% of the agricultural landscape.

Pacific (BC)

British Columbia was considered drought-free by the end of December, with minimal areas experiencing abnormally dry conditions. Only 1.5% of the Pacific region was in abnormally dry conditions, which accounts for just 4% of the agricultural landscape. Although southern areas of the province experienced fairly dry conditions in the late summer and early fall, precipitation in the last 90 days was considered near normal according to precipitation percentiles. In addition, streamflow values were near normal and snowpack in the region was reported at 98% of normal, indicating sufficient runoff for the spring months. As a result of these factors, the pocket of abnormally dry conditions that previously stretched to Nelson and the U.S. border was pulled back to Cranbrook and toward the BC–Alberta border. Significant precipitation in December led to the removal of moderate drought along the provincial border region as well: nearly 150 mm of precipitation fell in this area over the past 30 days. While dry conditions began to develop in the Peace River region stretching toward Fort Nelson, the remainder of the province saw near- to above-normal conditions in the month of December.

Prairies (AB, SK, MB)

The Prairies have thus far experienced little of the normal conditions associated with a La Niña winter. In fact, temperatures were generally 2 to 3 degrees above normal in the last 30 days. Also contrary to a typical La Niña, parts of the Prairies saw a lack of precipitation, especially in central Alberta and southern Manitoba. However, a number of storm systems passed through southern Alberta and western Saskatchewan, bringing much-needed moisture to drought-affected areas. In southwestern Alberta, previously reported moderate drought near Calgary was removed and the abnormally dry area was reduced. This area saw up to 40 mm of precipitation in December as well as near- to above-normal precipitation in the last 60 days; precipitation deficits now only show up in the last six months. However, abnormally dry conditions persisted in central Alberta, where a pocket of D0 near Edmonton expanded farther northwest toward Grande Prairie and Dawson Creek. This area reported a deficit of 55 to 95 mm below-normal precipitation over the last 6 months, which roughly equates to 10-25% below-normal. The pocket near Vegreville also expanded toward North Battleford as only 10 mm of precipitation fell in the area this month, along with dry conditions reported in the 90-day Standardized Precipitation Evapotranspiration Index (SPEI) data. Storm events in December brought up to 25 mm of precipitation to Southern Saskatchewan; this resulted in slight improvements to all drought classifications in the area, barring Saskatoon, as it reported its third driest December on record. Central Saskatchewan, however, was exempt from these precipitation events. A pocket of abnormally dry conditions was added around La Ronge, where they reported 55 to 95 mm below-normal precipitation within the last six months. The area covered by severe drought conditions expanded slightly eastward to Beausejour, MB, as this area received less than 60% of normal precipitation in the last 90 days. The D2 area includes Estevan, SK and Winnipeg, MB—both of which broke records this past year by experiencing their driest year on record. The area from Swan River to Dauphin, MB shows adequate precipitation in the past six months, but this is largely due to a single-day storm event in August in which most precipitation was likely lost due to runoff. This area received less than 40% of normal precipitation in the last 90 days and, as a result, remained in severe drought. The moderate drought in southern Saskatchewan and Manitoba

persisted, though it was reduced in eastern Saskatchewan based on adequate precipitation over the agricultural year since the beginning of April. Nearly 37% of the Prairie region was classified as either abnormally dry, in moderate drought or in severe drought; this includes 48% of the region's agricultural landscape.

Central (ON, QC)

Conditions differed between northern and southern portions of the Central region: minimal precipitation fell in northwestern Ontario, while the south generally saw improved moisture conditions, with the exception of southern Quebec. In northwestern Ontario, moderate drought was expanded to include Ear Falls, Sioux Lookout, and Osnaburgh House. In the last three months, this area received only 25-50% of normal precipitation. However, abnormally dry conditions and moderate drought were reduced significantly from Thunder Bay toward Nipigon as near-normal precipitation was reported in the last two months. In southern Ontario, abnormally dry conditions were also reduced due to near-normal precipitation in the last three months, in addition to near-normal streamflow levels. Moderate drought near Niagara Falls was also removed and surrounding D0 was reduced. Only areas from Lucknow to Windsor and Vaughan to Peterborough remained in pockets of D0. Eastern Ontario and western Quebec saw a slight expansion of abnormally dry and moderate drought conditions following a period of short-term dryness. Moderately low to extremely low precipitation, below the 20th percentile, was received in this area in the last 60 days. As a result, D1 remained near Sherbrooke, QC and a pocket of D1 developed east of Cornwall, ON. The abnormally dry conditions in this area were expanded slightly farther north up to Montreal and Drummondville, QC as satellite-derived data showed below-normal precipitation in the last 90 days. Fourteen percent of the Central region remains in either abnormally dry or in moderate drought; this includes approximately 13% of the agricultural landscape.

Atlantic (NB, NS, PEI, NL)

Significant precipitation in the Atlantic region in December greatly improved abnormally dry conditions and led to the removal of all drought. New Brunswick in particular received substantial precipitation, with some areas receiving up to 80 mm above-normal precipitation in the last 30 days. Previously reported moderate drought was eliminated in New Brunswick, Nova Scotia, and Prince Edward Island (PEI) as a result of near-normal precipitation in the last 60 days. However, satellite-derived data still showed signs of dryness in some areas. As a result, abnormally dry conditions covered a small area south of Fredericton, the western half of PEI, and from Liverpool to the northern tip of Nova Scotia. A small portion of D0 was removed around Inverness, Nova Scotia, but the surrounding areas remained affected by abnormally dry conditions as satellite-derived data show below-normal precipitation in the last three months. Abnormally dry conditions persisted in Newfoundland from Victoria Lake to Twillingate, despite adequate streamflow levels. Only 14% of the Atlantic region is classified as abnormally dry; this includes 26% of the region's agricultural landscape.

Northern (YT, NWT)

Much of the Northern region remained relatively unchanged from last month. A large swatch of abnormally dry conditions remained in place across northern Yukon and Northwest

Territories, as 25-50% below-normal precipitation was indicated by satellite-derived data in the past three months. Similar conditions also developed around Yellowknife, resulting in the creation of a small D0. Abnormally dry conditions still remained from Burwash Landing to Beaver Creek. Moderate drought also persisted in Old Crow, which reported its 5th driest December at 37% below-normal precipitation. Approximately 14% of the Northern region is classified as abnormally dry or in moderate drought.

UNITED STATES:

Over the course of December, drought expanded to the south and west, ultimately covering a large portion of central and southern California in moderate drought or worse conditions. The drought situation improved markedly in the Northeast during December. Parts of coastal New England that started the month in extreme drought had improved all the way to abnormal dryness by the end of the year, while large swaths of moderate drought in Pennsylvania and New York also were eradicated. Nationally, moderate drought coverage increased from 40.17 to 40.97%, severe drought coverage increased from 26.67 to 28.60%, extreme drought coverage increased from 17.57 to 18.56%, and exceptional drought coverage slightly increased from 8.24 to 8.26%.

Drought Outlook

The Climate Prediction Center is forecasting much of the western drought to persist, with a few areas of improvement. Oregon, northern California, and central Washington are forecast to see improvement in drought conditions during January, as is south-central Idaho. Southeast Nebraska and adjacent northeast Kansas, eastern Texas, south-central Oklahoma, and other spotty areas of drought in the South and Midwest are forecast to improve. Drought removal is also forecast in the remaining areas of long-term drought in the Northeast.

Temperatures

Overall, the United States experienced a warmer than normal December, with much of the central and northern Lower 48, Alaska, and Hawaii having above-normal temperatures. Two of the warmest areas were in the northern Great Plains and northern New England, where temperatures from 6 to 12 degrees above normal were commonplace. Arizona and Utah, as well as western portions of Colorado and New Mexico, experienced colder than normal temperatures. For more regionally specific information, please refer to the regional paragraphs below.

Precipitation

Precipitation was highly variable across the United States during December. The Northeast and Mid-Atlantic were primarily wetter than normal. California and adjacent portions of Arizona and New Mexico were mostly drier than normal for the month. Elsewhere, a mix of drier and wetter conditions occurred. Please see the regional paragraphs below for more details.

Northeast

During December, the majority of the Northeast received near-normal or above-normal precipitation. Compared to normal, one of the wettest areas was in north-central Pennsylvania and south-central New York, where a major snowstorm occurred near the midpoint of the month. Southern New England was also much wetter than normal during December. Widespread swaths of the Northeast received at least 150% of normal precipitation for the month. Warmer-than-normal temperatures were common in northern New England, where temperatures of at least 5 degrees above normal were widespread. Temperatures moderated toward 2 to 4 degrees above normal or near normal farther south in the region. Drought coverage was drastically reduced during December, falling from 21.09 to 3.63%.

Southeast

The Southeast remained drought-free during December. Scattered locations in Alabama, Georgia, and South Carolina, and much of the east-central Florida coast, received below-normal precipitation. Florida and southern Georgia were generally 2 to 5 degrees cooler than normal, while South Carolina was generally 1 to 4 degrees below normal. Elsewhere, temperatures were variable.

South

Temperatures during December were generally near or slightly below normal in Tennessee, Mississippi, and Louisiana, while temperatures from 2 to 6 degrees warmer than normal were common in northwest Arkansas, Oklahoma, and parts of Texas. Above-normal precipitation was common in southeast Texas, northwest Louisiana, and northwest Oklahoma, while much of the western Texas Panhandle was quite dry. Moderate drought coverage slightly increased from 45.58 to 45.97%, severe drought coverage increased from 23.04 to 26.45%, extreme drought coverage increased from 12.55 to 15.39%, and exceptional drought coverage remained at 6.58%.

Midwest

During December, below-normal precipitation occurred in a large area extending from central and southern Missouri to Kentucky, central and southern Illinois, Indiana, and western Ohio. Northern Iowa, southern Minnesota, northern Wisconsin, and northern Michigan also were drier than normal for December. Most of the region had warmer than normal temperatures. Compared to normal, the warmest areas were in Minnesota and northern Wisconsin, where temperature departures from 4 to 10 degrees above normal were common. Farther south and east, temperatures from 2 to 6 degrees above normal were widespread. Moderate drought expanded in northwest Minnesota during December, and regional moderate drought coverage increased from 9.05 to 12.36%. Severe drought coverage slightly increased from 2.22 to 2.26%, while extreme drought coverage remained at 0.45%.

High Plains

Precipitation departures from normal varied widely across the region. Generally, central and western North Dakota were drier than normal, while parts of south-central Kansas and central Nebraska were wetter than normal. To the east of the Continental Divide, above-normal temperatures covered nearly the entire region. The warmest areas were in North Dakota and northern Wyoming, where temperatures from 6-12 degrees above normal were common. Drought covered much of the region in December, including all of Colorado and most of Nebraska. Regional moderate drought coverage increased from 80.71 to 82.46%, severe drought coverage increased from 49.79 to 50.36%, extreme drought coverage rose from 26.78 to 27.09%, and exceptional drought coverage rose slightly from 5.53 to 5.71%.

West

A dry pattern persisted across large portions of the West in December as drought continued in many areas. Much of California was drier than normal during December, and drought expanded through much of the central and southern part of the state. Parts of southern Nevada, Arizona, and northern Utah were also quite dry compared to normal for December. Northwest Washington, and parts of northwest Oregon, in contrast, were wetter than normal. Temperatures across the northern and western tier of the region were warmer than normal, in particular in Montana, where temperatures of at least 6 degrees above normal were widespread. Cooler than normal temperatures generally prevailed west of the Continental Divide in Colorado and New Mexico, eastern Arizona, and Utah. Moderate drought coverage increased from 75.55 to 78.63%, and severe drought coverage increased from 60.85 to 65.18%. Extreme drought coverage increased from 44.67 to 46.49%, and exceptional drought coverage increased slightly from 22.10 to 22.16%.

Alaska, Hawaii and Puerto Rico

Warmer than normal temperatures occurred across Hawaii in December, with most temperatures ending up between 1 and 4 degrees above normal for the month. Most areas were also quite dry, as many locations received less than 25% of their normal rainfall. However, a few areas saw improvement in conditions, and overall drought coverage decreased. Moderate drought coverage dropped from 22.62 to 19.31%, severe drought coverage lessened from 12.98 to 9.68%, and extreme drought coverage decreased from 3.41 to 2.60%. Alaska remained free of drought in December. Below-normal precipitation fell in east-central Alaska, while southeast Alaska was wetter than normal for December. The majority of the state was warmer than normal, with temperatures of 2 to 8 degrees above normal commonplace. Temperatures were within a degree or two of normal across Puerto Rico. South-central and parts of southwest Puerto Rico received above-normal precipitation during December, while much of northern Puerto Rico was drier than normal for the month. A couple of areas of moderate drought developed in north-central Puerto Rico, bringing the percent coverage from zero to 3.31.

MEXICO:

National overview

Rainfall deficits continued in December in most of the country, although winter systems led to a cooling in temperatures. Seven cold fronts, wetness from the Pacific carried by the jet stream and three winter storms were the main meteorological phenomena that characterized the weather in December 2020. Above-average precipitation fell in some northern, western and southern states, as well as the Yucatan Peninsula. In the rest of the country, precipitation was absent or scarce, so there were no improvements in those drought areas, while the Yucatan Peninsula and some areas in the east continued to be free of drought and dryness. Drought coverage from moderate to exceptional (D1-D4) increased 7.88% compared to the last month, going from 47.16% on November 30 to 55.04% on December 31. The 17.0 mm of rain at the national level was 37.7% below the long-term average (1941-2019) of 27.3 mm for December, ranking as the 18th driest December. The national mean temperature of 16.3 degrees (Celsius) was 0.6 degrees below average and was ranked as the 12th coldest December, according to temperature records since 1953. December was the only month of the year that had temperatures below average on a national basis.

Regarding the preliminary annual results, the national rainfall total of 722.5 mm was 2.7% below the 1981-2010 average, or 7.3% below the long-term average (1941-2019), and was classified as the 21st driest year, according to data from 1941. The annual mean temperature of 22.4 degrees (Celsius) was 1.5 degrees above the average and was classified as the warmest year along with 2017 and 2019. Around 378,928 hectares were burned by forest fires over the year. The main states affected by fires were those on the Pacific coast, including Baja California, Jalisco Guerrero and Oaxaca, states in drought conditions throughout the year.

Northwest or North Pacific (Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit): These states cover approximately 21% of the national territory. Overall, the moisture produced by winter systems was most evident in the states of Baja California and Sonora between November and March, while the rest of the region received moisture from the Pacific, mainly from the jet stream. In December 2020, less than five rainy days were observed, and at the end of the month, rainfall totals were below average. Sonora and Sinaloa are the states most affected by drought. Despite a slight recovery in wetness in December, Sonora recorded their third driest period from July to December. Temperatures were close to average in Sonora, Sinaloa and Nayarit, and slightly warmer than average in the Baja California Peninsula. Extreme drought (D3) covers 54.1% of Sonora and severe drought (D2) covers 64.1% of Sinaloa.

Northern (Chihuahua, Coahuila, Durango, Zacatecas and San Luis Potosí): These states make up 33.4% of the country's land area. For the second month in a row, Coahuila received rainfall during the month, along with light rainfall in Chihuahua and Zacatecas. These rains did not mean a recovery from drought conditions, and Chihuahua recorded their second driest July–December period. Severe to extreme drought (D2 to D3) covers more than 80% of Chihuahua, an increase of 5% from the previous month. The states of Chihuahua, Coahuila, Durango and Zacatecas also received rainfall in the form of snowfalls

during the passage of two frontal systems at the end of the month, which allowed a drop in temperatures in these northern states of the country. Monthly mean temperature was 1 to 2 degrees below average in the northern states, and the number of cold days increased.

Northeast (Nuevo Leon and Tamaulipas): This region accounts for 7.3% of the national territory. Moderate and severe drought (D1 and D2) expanded to northern Nuevo León and Tamaulipas in the last month. Drought intensified in these states due to low rainfall received in the last three months; Nuevo León and Tamaulipas recorded their second and third driest period from October to December, respectively. Moderate to extreme drought (D1-D3) covers 83% of Nuevo León and 76.9% of Tamaulipas, an increase of more than 50% over the previous month. In the northeast, temperatures were warmer than average, and Nuevo Leon had fewer than five frost days during the month.

Central-West (Aguascalientes, Jalisco, Guanajuato, Colima and Michoacan): These states represent 9.3% of the national territory. The wetness from the Pacific brought some rainfall to western Jalisco and Aguascalientes, although it was not enough to improve drought conditions. The rest of the states did not receive rainfall, and drought and dryness continued to increase. Only Colima does not have any drought conditions, due to a better summer. Temperatures were warmer than average in the central-west states. Jalisco and Michoacán have 43.7% and 58.3% of their territories in moderate to severe drought (D1-D2), respectively, while Aguascalientes has 75% in moderate drought.

Central-South (Queretaro, Hidalgo, State of Mexico, Tlaxcala, Puebla, Morelos and Mexico City): This region represents 5.2% of the country. Drought development continued in the states of Querétaro, Hidalgo and the west part of the State of Mexico, because at the beginning of dry season, the rains decreased. Queretaro and Hidalgo recorded their driest period and their third driest period from October to December, respectively; moderate to severe drought (D1-D2) coverage reached 63.2% in Querétaro and 44.5% in Hidalgo. Farther east, rainfall continued below average in the Cutzamala basins (limits of Michoacán and the State of Mexico) that supply a portion of water to Mexico City; therefore, according to the National Committee of Large Dams (CNGP) of CONAGUA, restrictions are expected in the winter and spring months. Temperatures were cooler than average during December, mainly in the Transverse Volcanic Axis regions. Most of the State of Mexico and Tlaxcala experienced around ten frosty days throughout the month.

Gulf of Mexico (Veracruz and Tabasco): These states along the Gulf of Mexico constitute 4.8% of the country's land area. The increase in drought and dryness continued in northern Veracruz, but toward the south of that state and in Tabasco the drought continued to be absent for another month. The frontal passages dropped temperatures in the mountainous areas of Veracruz; at the same time, northern winds have intensified. The rains were less intense than in November, but the effects of the previous month's floods are still being felt. Tabasco recorded their second wettest period from October to December, while temperatures were cooler in Veracruz, which experienced their third coldest December.

South Pacific (Guerrero, Oaxaca and Chiapas): These states account for 11.9% of the national territory. Guerrero and Oaxaca represent another nucleus of drought. With light rains in the limits of Guerrero and Oaxaca, the rest of the areas with drought did change compared to the last month. Temperatures were warmer than average on the coasts and cooler than average in areas farther inland. Guerrero increased its coverage (D1-D3) from 63.7 to 68.7% in the last month, while for Oaxaca the drought coverage (D1-D2) went from 19.5 to 19.6%. Chiapas has once again been free of any drought concern.

Yucatán Peninsula (Campeche, Quintana Roo and Yucatan): The Yucatan Peninsula consists of 7.1% of the national territory. Above-average rains were observed in Campeche and northern Quintana Roo due to the passage of frontal systems that also left cooler temperatures. At the end of December, the second wettest year was recorded for Campeche and Quintana Roo, and it was the wettest year in Yucatan, all thanks to rainfall from tropical cyclones during the summer of 2020. At the end of the year the area is free from drought or abnormal dryness.